Home work #5	Ch 3: 3.4-3.5	Fri, 01/28/05

Ch. 3

Q17:

No. They will reach the floor at the same time. The important factor is the highness of the table only.

Q22:

For this case the bullet will hit the target above the center.

E7:

a) $v = v_0 - gt$, v at the highest point is equal 0, hence $0 = v_0 - gt$, or $t = v_0/g =$ (15 m/s)/(10 m/s^2) = 1.5 s

$v = v_0 - gt$ = (15 m/s) – (10 m/s^2)(1 s) = 5 m/s, answer: 5 m/s, upward

b) $v = v_0 - gt$ = (15 m/s) – (10 m/s^2)(2 s) = - 5 m/s, answer: 5 m/s, downward

E11:

a) $d = vt$, $t = d/v$ = (150 m)/(900 m/s) = 0.167 s

b) $d = \frac{1}{2} gt^2 = \frac{1}{2}$ (10 m/s^2) (0.167 s)$^2 = \frac{1}{2}$ (10 m/s^2) (0.028 s^2) = 0.139 m = 13.9 cm

E15:

a) $d = \frac{1}{2} gt^2$, t = $\sqrt{2d/g} = \sqrt{(2 \cdot 5 \text{ m})/(10 \text{ m/s}^2)} = \sqrt{(1 \text{ s}^2)}$ = 1 s

b) $d_{hor} = v_{hor}\, t$ = (6 m/s)(1 s) = 6 m

E16:

a) $v = v_{vert} - gt$, at the high point $v = 0$, hence $v_{vert} = gt$,

$t = v_{vert}/g = (30 \text{ m/s})/(10 \text{ m/s}^2) = 3 \text{ s}$

b) $d = v_{hor}t = (30 \text{ m/s})\ (3 \text{ s}) = 90 \text{ m}$

CP3:

a) For both balls $d = ½\ gt^2$, hence $t = \sqrt{(2d)/g} = \sqrt{(2\text{x}0.8 \text{ m})/(10 \text{ m/s}^2)} =$

$= \sqrt{(1.6/10)\ \text{s}^2} = 0.4 \text{ s}$

b) Ball A: $d = vt = (3 \text{ m/s})(0.4 \text{ s}) = 1.2 \text{ m}$

Ball B: $d = vt = (5 \text{ m/s})(0.4 \text{ s}) = 2 \text{ m}$

c) No. For both balls: $t_l = 0.4 \text{ s}$

Ball A: $t_{hor} = d/v = (1.2 \text{ m})/(3 \text{ m/s}) = 0.4 \text{ s}$,

the total time $t_{tot} = 0.4 \text{ s} + 0.4 \text{ s} = 0.8 \text{ s}$

Ball B: $t_{hor} = d/v = (1.2 \text{ m})/(5 \text{ m/s}) = 0.24 \text{ s}$

the total time $t_{tot} = 0.24 \text{ s} + 0.4 \text{ s} = 0.64 \text{ s}$